

**What is claimed is:**

1           1. A carbon nanocapsule thin film, prepared by  
2           electroplating a plurality of carbon nanocapsules onto a  
3           substrate.

1           2. The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the carbon nanocapsule is a polyhedral  
3           carbon cluster constituted by having concentric multi-  
4           layers of closed graphitic sheet structure. The diameter  
5           of a carbon nanocapsule is about 3-100 nm.

1           3. The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the carbon nanocapsule is hollow.

1           4. The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the carbon nanocapsule is a metal-filled  
3           carbon nanocapsule filled with metals, metal oxides,  
4           metal carbides, or alloys.

1           5. The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the thickness of the carbon nanocapsule  
3           thin film is 20nm-1mm.

1           6. The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein a redox agent or an external electric  
3           field is applied to offer a driving force for  
4           electroplating.

1           7. The carbon nanocapsule thin film as claimed in  
2           claim 6, wherein the potential of the external electric  
3           field is 0.01V-6V.

1           8.    The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the carbon nanocapsules comprise a  
3           functional group.

1           9.    The carbon nanocapsule thin film as claimed in  
2           claim 8, wherein the functional group carries at least  
3           one positive charge after dissociation.

1           10.   The carbon nanocapsule thin film as claimed in  
2           claim 9, wherein the functional group is amine or  
3           quaternary ammonium.

1           11.   The carbon nanocapsule thin film as claimed in  
2           claim 8, wherein the functional group carries at least  
3           one negative charge after dissociation.

1           12.   The carbon nanocapsule thin film as claimed in  
2           claim 11, wherein the functional group is carboxyl group,  
3           SO<sub>4</sub><sup>-</sup> or PO<sub>4</sub><sup>-</sup>.

1           13.   The carbon nanocapsule thin film as claimed in  
2           claim 1, wherein the carbon nanocapsules is 20-100 vol%.

1           14.   A carbon nanocapsule thin film preparation  
2           method, comprising:

3                 providing a substrate; and  
4                 electroplating a plurality of carbon  
5                 nanocapsules onto the substrate.

1           15.   The carbon nanocapsule thin film preparation  
2           method as claimed in claim 14, wherein the carbon  
3           nanocapsule is a polyhedral carbon cluster constituting  
4           multiple graphite layers having a balls-within-a ball

5 structure, and the diameter of a carbon nanocapsule is 3-  
6 100 nm.

1 16. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsule is hollow.

1 17. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsule is a metal-filled carbon nanocapsule filled  
4 with metals, metal oxides, metal carbides, or alloys.

1 18. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the thickness of  
3 the carbon nanocapsule thin film is 20nm-1mm.

1 19. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein a redox agent or  
3 an external electric field is applied to offer a driving  
4 force for electroplating.

1 20. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 19, wherein the potential of  
3 the external electric field is 0.01V-6V.

1 21. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsules comprise a functional group.

1 22. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 21, wherein the functional  
3 group carries at least one positive charge after  
4 dissociation.

1           23. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 22, wherein the functional  
3 group is amine or quaternary ammonium group.

1           24. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 21, wherein the functional  
3 group carries at least one negative charge after  
4 dissociation.

1           25. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 24, wherein the functional  
3 group is carboxyl group, SO<sub>4</sub><sup>-</sup> or PO<sub>4</sub><sup>-</sup>.

1           26. The carbon nanocapsule thin film preparation  
2 method as claimed in claim 14, wherein the carbon  
3 nanocapsules is 20-100 vol%.